

REMARKS

This office Action follows the response filed on May 24, 2002, in which claim 1 was amended and new claims 3-8 were added. Claims 1-8 are pending in the present application. Claims 1-8 are rejected. Claims 1 and 4 are herein amended. Attached hereto is a marked-up version of the changes made by the current amendment. The attached page is captioned "Version with markings to show changes made."

Change to the Title:

The title has been changed herein to be more descriptive of the invention, and to make the title correspond with that of the PCT application from which the present application depended.

Claim Rejections under 35 U.S.C. §112

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the terms "other acrylic esters." Without further qualification, the Examiner asserts that it is unclear what the claim intends to describe, especially in light of the preceding recitation of "alkyl acrylates other than those having a C₂-C₈ alkyl group."

Applicants herein amend the claim to remove the word "other" and to more clearly recite that which is intended by the claim.

Rejections under 35 U.S.C. §103

Claims 1-8 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 3,996,173 to Heichele et al. in view of U.S. Patent No. 4,670,509 to Aoyama et al.

The Examiner asserts that it would have been obvious to use the graft copolymer of Aoyama et al. in the composition of Heichele et al. to arrive at the claims of the present invention, and that one would have expected such an embodiment to display similar properties.

The Examiner notes that the rejection has not been overcome by amendment because the crosslinked elastomeric polymer may contain 0% by weight of “other copolymer monomers”. As such, the Examiner asserts that said crosslinked elastomeric polymer would be comprised of 79.9-99.9% of a C₂-C₈ alkyl acrylate and 0.01-5% of a polyfunctional monomer. The Examiner asserts that the graft copolymer of the present claims still lies within the purview of the prior art because the term “comprises” does not exclude any uncited components.

As for the rejection of claims 1 and 2 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 3,996,173 to Heichele et al. in view of U.S. Patent No. 4,670,509 to Aoyama et al., the Examiner notes that Applicants assertion that the “thus-modified vinyl chloride molding composition is different from the presently claimed vinyl chloride resin composition” is based on an apparent difference in reduced viscosities of the MEK extract of the graft copolymers. The Examiner notes that Aoyama et al. states that the specific viscosity η_{sp} of the MEK extract is at least 0.6 as measured at a concentration of 0.1 g/100 mL in acetone at 30°C, which the Applicants have asserted equates to a reduced viscosity η_{sp}/C of at least 6.

The Examiner notes that, while this may be true, this “says nothing” about the viscosity of an MEK extract having a concentration of 0.2 g/100 mL as cited in the present claims. The

Examiner asserts that since viscosity increases with increasing concentration non-linearly, there is reason enough to believe that the reduced viscosity of the prior art material lies within the claimed range.

Applicants respectfully disagree with the rejections.

Applicants note that Aoyama et al. discloses a graft copolymer comprising 15-50 parts by weight of a graft monomer component composed of 30-100% by weight of methyl methacrylate and 0-70% by weight of other monomer such as alkyl acrylate, and 50-85 parts by weight of a crosslinked acrylic rubber. The MEK-soluble portion of the graft copolymer, which would correspond to the graft portion of the graft copolymer, has a specific viscosity η_{sp} of at least 0.6 (0.1 g/dl acetone solution, at 30 °C) which is identical to a reduced viscosity η_{sp}/c of at least 6.

As indicated in the enclosed Rule 132 Declaration, the MEK-soluble portion of a graft copolymer having a reduced viscosity η_{sp}/c of 6.3 measured in a concentration of 0.2 g/dl in acetone at 30°C which is greater than the claimed range of 1 to 5, exhibits a reduced viscosity of 4.9 when measured in a concentration of 0.1 g/dl in acetone at 30°C which is smaller than the lower limit 6 taught by Aoyama et al. Accordingly, the reduced viscosity of the MEK-soluble portion of the graft copolymers of Aoyama et al. is greater than 5 when measured in a concentration of 0.2 g/dl in acetone at 30°C.

As shown in Comparative Examples 2 and 6 in the specification, if the reduced viscosity of the MEK-soluble portion is larger than 5 (0.2 g/dl, 30°C), the surface appearance of molded products is deteriorated.

Even if the graft copolymer of Aoyama et al. is used in the composition of Heichele et al., the thus-modified vinyl chloride composition is still different from the presently claimed

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composition. The proposed combination of the cited references would not have lead a person skilled in the art to arrive at applicants' claimed invention.

Further, Applicants note that Aoyama et al. does not teach or suggest the graft copolymer as defined in the present claims, which contains an MEK-soluble portion having a lower molecular weight than that taught by Aoyama et al. Aoyama et al. does not teach or suggest that such a graft copolymer can successfully improve the Gardner impact strength, which is deteriorated when a large amount of calcium carbonate is incorporated into a vinyl chloride resin in order to improve the Izod impact strength and flexural modulus.

Claims 1 and 2 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 3,996,173 to Heichele et al. in view of U.S. Patent No. 5,693,699 to Bertelo et al.

Applicants note that since the impact modifiers disclosed in Bertelo et al. are graft copolymers derived from a conjugated diene which are chosen from butadiene-styrene thermoplastic resins such as ABS resins, MBS resins and alkyl (meth)acrylate-butadiene-styrene resins, and since the impact modifiers disclosed in Meunier (FR 2,551,447) are graft copolymers wherein a (meth)acrylic copolymer is grafted onto a crosslinked backbone copolymer of a conjugated diene and an alkyl acrylate (see column 2, line 55 to column 3, line 17 of Bertelo et al.), claim 1 was amended to exclude graft copolymers derived from diene-containing backbone polymers in reply to the previous Office action.

In paragraph 6 of the Office action, the Examiner states as follows: "This rejection has not been overcome by amendment because the crosslinked elastomeric polymer may contain 0% by weight of other copolymerizable monomers. As such, said crosslinked elastomeric polymer would

be composed of 79.9-99.9% of a C₂-C₈ alkyl acrylate and 0.01-5% of a polyfunctional monomer. Note that the graft copolymer of Meunier comprises a C₂-C₁₂ alkyl acrylate and 0.02-10% of a crosslinked agent containing two vinyl moieties (claims 1 and 2). Therefore the graft copolymer of the present claims still lies within the purview of the prior art because the term “comprises” does not exclude any uncited components.”

However Applicants respectfully disagree with the Examiner.

Applicants initially note that claim 1 defines that the crosslinked elastomeric polymer is composed of ...organosiloxanes. As to the interpretation of claim languages, Applicants understand that the language “composed of” is interpreted to correspond to “consists of” and does not include any uncited components.

Secondly, Applicants submit that even if this understand is not correct, when the crosslinked elastomeric polymer contains 0% by weight of other copolymerizable monomers, the crosslinked polymer cannot contain “other copolymerizable monomers,” including conjugated diene monomers.

The term “other copolymerizable monomers” encompasses all monomers other than the recited monomers, i.e., C₂-C₈ alkyl acrylates and 0.01-5% of polyfunctional monomers. Accordingly, in order to exclude conjugated diene compounds essential to Bertelo et al. and Meunier from the claimed crosslinked elastomeric polymer, claim 1 was amended to limit the other copolymerizable monomers to those selected from the group consisting of monomers having a single vinyl group and organosiloxanes. Applicants submit that that the claimed crosslinked elastomeric polymer contains other copolymerizable monomers.

The Examiner states that “the graft copolymer of Meunier comprises C₂-C₁₂ alkyl acrylates and 0.02-10% of a crosslinking agent containing two vinyl moieties (claims 1 and 2).” However,

Applicants submit that the graft copolymers of Meunier have a backbone containing 0.5-30% of a conjugated diene as well as the C₂-C₁₂ alkyl acrylates and 0.02-10% of the crosslinking agent (see previous Office action of November 26, 2001, page 3, lines 6-4 from the bottom, and Bertelo et al., column 3, lines 4-13).

The graft copolymers disclosed in Bertelo et al. and the French patents contain a backbone derived from a conjugated diene, and are different from the presently claimed graft copolymer. Accordingly, even if these graft copolymers are used in the composition of Heichele et al., the thus-modified vinyl chloride composition is still different from the presently claimed composition. The proposed combination of the cited references cannot lead a person skilled in the art to arrive at Applicants' claimed invention.

In light of the above, it is believed that Applicants' claimed invention is not obvious from the cited references. Applicants earnestly request withdrawal of the rejections and passage of the claims to issue.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

Amendment under 37 C.F.R. 1.116
Hirokazu IGUCHI et al.

U.S. Patent Application Serial No. 09/700,171
Attorney Docket No. 001478

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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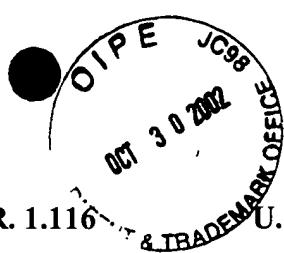


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PATENT TRADEMARK OFFICE

Enclosures: Version with markings to show changes made
Declaration under 37 C.F.R. §1.132

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Amendment under 37 C.F.R. 1.116
Hirokazu IGUCHI et al.

U.S. Patent Application Serial No. 09/700,171
Attorney Docket No. 001478

VERSION WITH MARKINGS TO SHOW CHANGES MADE
Serial No. 09/700,171

IN THE SPECIFICATION:

Please amend the title to:

-- VINYL CHLORIDE RESIN COMPOSITION AND MOLDED ARTICLES

MADE THEREOF OBJECT COMPRISING THE SAME --

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OCT 31 2002

IN THE CLAIMS:

TC 1700

Please amend claims 1 and 4 as follows:

1. (Twice Amended) A vinyl chloride resin composition having excellent weatherability and impact resistance which comprises:

(a) 100 parts by weight of a vinyl chloride resin,

(b) 1 to 10 parts by weight of a graft copolymer which is obtained by polymerizing 25 to 75 parts by weight of a graft monomer component to 25 to 75 parts by weight of a crosslinked elastomeric polymer so that the total thereof is 100 parts by weight, and the methyl ethyl ketone-soluble portion of which has a reduced viscosity η_{sp}/c , where η_{sp} is specific viscosity and c is concentration of polymer in solvent in g/100 mL, of 1 to 5 measured at 30°C with respect to its 0.2 g/100 cc acetone solution,

said graft monomer component being composed of 40 to 100% by weight of methyl methacrylate and 0 to 60% by weight of at least one monomer selected from the group consisting of an alkyl acrylate having a C₁ to C₈ alkyl group, an alkyl methacrylate having a C₂ to C₆ alkyl group, an unsaturated nitrile and an aromatic vinyl compound, and said crosslinked elastomeric

polymer being composed of 79.9 to 99.99 % by weight of an alkyl acrylate having a C₂ to C₈ alkyl group, 0.01 to 5% by weight of a polyfunctional monomer and 0 to 20% by weight of other monomers copolymerizable therewith, said other monomers being selected from the group consisting of monomers having a single vinyl group and organosiloxanes when they are used, and

(c) 10 to 30 parts by weight of calcium carbonate.

4. (Amended) The composition of claim 1, wherein said other monomers in said crosslinked elastomeric polymer are a member selected from the group consisting of alkyl acrylates other than those having a C₂ to C₈ alkyl group, ~~other~~ acrylic esters, methacrylic esters, acrylic acid, metal salts of acrylic acid, acrylamide, aromatic vinyl compounds and their derivatives, acrylonitrile, methacrylonitrile, vinyl ether compounds, vinyl ester compounds, vinyl halides, vinylidene halides, cyclic siloxanes, alkoxy silanes and methacryloyloxy siloxanes.